

### Agriculture

#### Processes Contributing GHG Emission

Changes in the area under agriculture, land use and land management practices can lead to changes in aboveground biomass stocks and soil organic matter.

#### Potential GHG Emission Reduction Areas

- GHG emission reductions through multi-site manure collection and treatment in a central plant
- Methane recovery in agricultural activities at house hold/small farm level
- Avoided emissions from biomass wastes through use as feedstock in pulp and paper production or in bio-oil production
- Project activities that involve the distribution and application of inoculants on soybean in a soybean-corn rotation cropping on acidic soils on existing cropland.

### Chemical

#### Processes Contributing GHG Emission

The chemical industry's work with environmental issues is even more important than in other industries. Moreover, chemical products with environmentally hazardous properties are one of the main environmental concerns in the chemical industry.

#### Potential GHG Emission Reduction Areas

- Incineration of HFC 23 waste streams
- Catalytic N<sub>2</sub>O destruction in the tail gas of Nitric Acid or Caprolactam Production Plants"
- Avoidance of fossil fuel combustion for carbon dioxide production to be used as raw material for industrial processes
- Reduction in consumption of electricity by recovering soda from paper manufacturing process
- Hydrogen production using methane extracted from biogas
- Project activities that reduce emissions associated with conventional CO<sub>2</sub> production process by means of extracting CO<sub>2</sub> from the tail gas coming out of an industrial facility

### Fertilizer

#### Processes Contributing GHG Emission

- Petroleum products are used both as feed stock and as fuel. Diesel/ natural gas are mostly used as fuel.
- The feed stocks for the Fertilizer units are coal, fuel oil, naphtha and natural gas.
- Production of nitrogenous Fertilizers is more energy intensive.
- Electricity is also a major consumer in any Fertilizer industry, used, mainly for driving motors and heaters. Mostly, electricity is generated either by using coal or diesel as fuel.

#### Potential GHG Emission Reduction Areas

- Energy Efficiency
- Fuel Switch
- Feed Switch
- CO<sub>2</sub> Recovery (CDR)
- Process Gas recovery
- N<sub>2</sub>O emission abatement
- Use of natural Inhibitors

## Iron & Steel

### Processes Contributing GHG Emission

The steel industry consumes large volumes of coal, as a metallurgical reductant for iron ore in the iron making process for which there is no substitute. The production of iron and steel generates CO<sub>2</sub> emissions.

### Potential GHG Emission Reduction Areas

- Energy Efficiency improvement
- Use of alternative fuels
- Waste heat recovery power generation

## Mining

### Processes Contributing GHG Emission

- Mining is a significant emitter of greenhouse gases
- Mining can have adverse effects on surrounding surface and ground water if protective measures are not taken. The result can be unnaturally high concentrations of some chemicals, such as arsenic and sulfuric acid, over a significant area of surface or subsurface
- Mining can have effect on some environmental issues such as erosion, formation of sinkholes, loss of bio-diversity, and contamination of groundwater and surface water by chemicals from mining processes.

### Potential GHG Emission Reduction Areas

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## Oil & Gas

### Processes Contributing GHG Emission

The O&G sector encompasses a wide variety of operations, ranging from the discovery and production of O&G, to the delivery of products to consumers. In the scope of upstream and downstream operations, O&G companies emit two primary types of GHG emissions: carbon

### Potential GHG Emission Reduction Areas

- Waste Gas Recovery (Avoided Flaring)
- Steam Optimization System
- Process optimization
- Fuel Switch
- Energy Efficiency
- Natural Gas Leak reduction
- Recovering gas at oil wells
- Tail gas recovery: Reduction of Flaring and use of recovered gas for methanol production
- Natural gas based package cogeneration
- Grid connected electricity generation using natural gas
- Recovery and utilization of waste gas in refinery

## Pulp & Paper

### Processes Contributing GHG Emission

- The paper machine, which is the greatest consumer of steam
- The black water concentration process is also the greatest consumer of electric power.

### Potential GHG Emission Reduction Areas

- Gas turbine cogeneration with Waste Heat
- Recovery for boiler replacement
- Energy efficiency improvements
- Methane avoidance by waste water treatment
- Use of biomass waste as feedstock
- Use of alternative fuels

## Textile

### Processes Contributing GHG Emission

- In the forms of electricity, for machinery, cooling and temperature control systems,
- Lighting, office equipment
- Liquefied petroleum gas, coal, oil as a fuel for boilers which generate steam;
- In the fields of dyeing and finishing, fiber production, spinning, weaving and clothing manufacturing.

### Potential GHG Emission Reduction Areas

- Energy Efficiency
- Fossil fuel switch from high carbon intensive fuel to low carbon intensive fuel (e.g. from HFO/Diesel to Gas)
- Use of alternative fuels (Rice husk, cotton waste, etc)

## Transport

### Processes Contributing GHG Emission

- Urban traffic contributes to local pollution and climate change
- Fossil fuels used in the transport sector are the major source of carbon emission

### Potential GHG Emission Reduction Areas

- Fuel Switch
- Vehicle Replacement and introduction for low-emission vehicle
- Cable cars for mass rapid transit system
- Plant oil production and use for transport applications
- Reduce emissions per unit transported

## Waste

### Processes Contributing GHG Emission

- Waste accumulation, especially MSW is a growing problem.
- Waste generation rate is increasing with the increase of population, technological development and the change of the life style of people

### Potential GHG Emission Reduction Areas

- Waste treatment using suitable technology like composting, bio-methanation etc
- Closure of existing dump sites to capture LPG Methane flaring
- Landfill methane recovery
- Methane recovery in wastewater treatment
- Methane emissions reduction from organic waste water and bioorganic solid waste using co-composting
- Mitigation of greenhouse gas emission from treatment of industrial waste water
- Avoidance of methane production from decay of biomass through controlled combustion, gasification or mechanical/thermal treatment